OPTICAL SPECTROSCOPY PATHLENGTH MEASUREMENT SYSTEM

Abstract of the Disclosure

A physiological monitor utilizes Faraday rotation measurements to estimate mean photon pathlengths through tissue. These pathlength estimates, along with corresponding optical spectroscopy measurements allow the noninvasive monitoring of blood constituent concentrations. The technique is particularly applicable to noninvasive blood glucose measurements. The physiological monitor has a polarized light source for illuminating tissue and a magnetic field generator which creates a magnetic field within the tissue during illumination. The magnetic field imparts a Faraday rotation in the plane of polarization of the incident light beam as it propagates through the tissue and emerges as a transmitted light beam. A polarimeter is used to measure the rotation of the transmitted light. A signal processor then computes an estimate of the mean pathlength from the polarimeter output. The polarized light source has a multiple wavelength optical emitter and, in conjunction with the polarimeter detector, also functions as a spectrometer. The signal processor combines spectroscopic measurements at various wavelengths with corresponding mean pathlength estimates to compute blood constituent concentrations.

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